Opening Up Closed Questions – Group work from London

**Please note:** The original questions are in *blue italics* and group suggestions are listed thereafter.

**Question:**

*Draw pictures that might help someone predict the next four terms of the pattern 1, 4, 9, 16, …*

Create and represent the first four terms of a pattern that might help someone predict the next four terms of the pattern.

Create a pattern of pictures that might help someone predict the next four terms of the pattern of your choice. Describe your pattern in a second way.

Create pattern that would allow a person to predict its next four terms. (Use numbers, pictures or shapes)

Draw pictures that might help someone predict the next four terms of a pattern.

**Question:**

*Use a table of values to find the number of toothpicks you would need to build the 7th figure. Explain your thinking.*

Make a toothpick pattern. Find the number of toothpicks you would need to build a figure between the 5th and 10th. Explain your thinking.

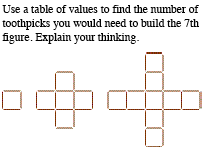
The sixth term in a linear pattern has a term value of 64.

1. What might its pattern rule be?
2. Find at least 2 ways to represent this rule.

Design a growing pattern where the first two terms are 4,16,…

Describe your pattern.

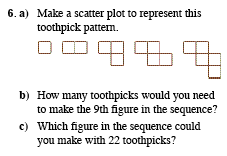
Create a pattern using toothpicks. Extend the pattern using a table of values until you can determine a patterning rule.

This is a figure in pattern  (only second picture should be shown). Using toothpicks create the pattern and show which term this figure is.

How many different ways can you find the number of toothpicks to build the 7th figure? Ask for similarities and differences with a partner. Think-Pair-Share.

**Question:**

1. *Make a scatter plot to represent this toothpick pattern.*



1. *How many toothpicks would you need to make the 9th figure in the sequence?*
2. *Which figure in the sequence could you make with 22 toothpicks?*

What could the 10th term be for the this linear growing pattern.

Create a toothpick sequence that uses 50 toothpicks in the 10th figure. The first figure an have as many toothpicks as you wish.

Choose a manipulative. Create a pattern include the first four terms. Describe and represent your pattern in at least 2 ways.

Design a toothpick pattern that is linear, building and recording the first three terms. Explain your pattern.

Make a scatter plot to represent a toothpick pattern. Give it to a friend and have them make the 9th figure in the sequence. What hint would you give someone who is struggling? What would the algebraic expression for your toothpick pattern be?

1. Make a graphédiagram to represent this toothpick pattern.
2. Choose a figure between the 7th to 10th and find out the number of toothpicks needed to make that figure in the sequence.
3. Choose an even number of toothpicks between 20 and 30, and find out its position in the sequence.

A toothpick pattern uses 4 toothpicks in the first figure, 10 toothpicks in the 3rd figure and 16 in the 5th figure.

1. How many toothpicks will be used in the 9th figure? Explain how you know.
2. What might a scatter plot look? Explain how you know.

**Question:**

1. *Complete the table of values for the sequence shown.*

|  |  |  |
| --- | --- | --- |
| ***Term Number (figure number)*** | ***Picture*** | ***Term Value (number of squares)*** |
| 1 |  | 2 |
| 2 |  |  |
| 3 |  |  |
| 4 |  |  |
| 5 |  |  |

1. *Create an algebraic expression for the nth term of the sequence.*
2. *Use your algebraic expression to calculate the 30th term in the sequence.*

The 30th term in the sequence is 60. Create an algebraic expression and complete a table of values for it.

Fill in the empty table. Create an algebraic expression. Use your algebraic expression to find the 30th term.

1. Create a table of values that shows a growing pattern.
2. Can you express your pattern as a rule or algebraic expression? More than one rule?

(Big Idea #3)

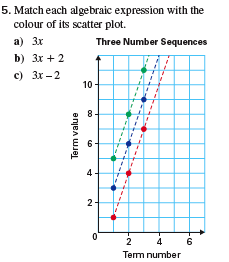
Strategy: Leave the values in the problem open.

Through the use of leading questions, students identify different purposes (ie. Real life situations) and the relationships of the different representations.

1. Create a growing pattern that shows a consistent increase.
2. Find the 25th term.

**Question:**

*Match each algebraic equation with*



*the colour of its scatter plot.*

1. *y = 3x*
2. *y = 3x + 2*
3. *y = 3x - 2*

Explain why the lines are parallel.

(Remove grid and numerical scales.) Write a possible equation for each of the three lines.

Given the equation y=3x+■, select three different values for ■ and graph. What is the relationship between the equations?

Describe the similarities and differences in these linear growing patterns. Refer to the algebraic representation or the graph or a pictorial representation.

Create 3 equations that have the same slope and each having a different y-intercept. What is similar about your graphs? To make these lines intersect, what would you need to change?

Draw 3 parallel lines on a coordinate grid. Find the equations for each line. Discuss any similarities or differences. (What do you notice about the equations?)

Create three (or more) equations that share a common characteristic and graph them.

How are they similar? How are they different?

**Question:**

*Find the equation of the line that passes through (-4,2) and (6,2).*

Find the equation of the line that passes through (1,1) and (2, ■) where ■ ,ay be any number of your choice.

Choose any two points and produce the linear equation.

**Question:**

*What’s My Point? Which graph fits the ordered pairs? Why?*

*A(4 , 3) B(0 , 3) C(2.5 , 3)*



**Graph 3**



**Graph 2**

**Graph 1**

Draw a graph that fits the ordered pairs A(3,4) B(0,3) C(2.5,3)

How do you know it fits?

Name 2 sets of points that would result in each of the following:



**Graph 3**



**Graph 2**

**Graph 1**